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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/623,646	07/22/2003	Chia-Chen Chen	0941-0794P	4737

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EXAMINER	
BROOME, SAID A	
ART UNIT	**PAPER NUMBER**
2628	

SHORTENED STATUTORY PERIOD OF RESPONSE	NOTIFICATION DATE	DELIVERY MODE
3 MONTHS	03/29/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Notice of this Office communication was sent electronically on the above-indicated "Notification Date" and has a shortened statutory period for reply of 3 MONTHS from 03/29/2007.

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mailroom@bskb.com

Office Action Summary	**Application No.**	**Applicant(s)**	
	10/623,646	CHEN ET AL.	
	Examiner	**Art Unit**	
	Said Broome	2628	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 January 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 1/17/07 has been entered.

Response to Amendment

1. This office action is in response to an amendment filed 1/17/2007.

2. Claims 1 and 5 have been amended by the applicant.

3. Claims 2-4 and 6-8 are original.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-8 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The added material which is not supported by the original disclosure is as follows:

"wherein the reconstructed 3D model is locked in the same position despite of the sample numbers."

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The following claim language recited in claims 1 and 5 is unclear: "wherein the reconstructed 3D model is locked in the same position despite of the sample numbers." However, the claim language has been interpreted to recite that the structure of the reconstructed model is maintained regardless of the changes in resolution of the model.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-8 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claims 1 and 5 recite "A computer-implemented method...", however the claims appear to be directed to an abstract idea rather then a practical application of the abstract idea. Therefore, the claimed invention does not posses "real world" value. The tangible requirement does not necessarily mean that a claim must either be tied to a particular machine or apparatus or must operate to change articles or materials to a different state or thing. However, the tangible requirement does require that the claim must recite more than a § 101

judicial exception, in that the process claim must set forth a practical application of that § 101 judicial exception to produce a real-world result.

Claims 1-8 are rejected under 35 U.S.C. 101 because claims 1 and 5 recite: "A computer-implemented method...". However, a computer implement method is nothing more than just a program, which is non-statutory. Similarly, computer programs claimed as computer listings per se, i.e., the descriptions or expressions of the programs, are not physical "things." They are neither computer components nor statutory processes, as they are not "acts" being performed. Such claimed computer programs do not define any structural and functional interrelationships between the computer program and other claimed elements of a computer which permit the computer program's functionality to be realized. In contrast, a claimed computer-readable medium encoded with a computer program is a computer element which defines structural and functional interrelationships between the computer program and the rest of the computer which permit the computer program's functionality to be realized, and is thus statutory. See Lowry, 32 F.3d at 1583-84, 32 USPQ2d at 1035. Accordingly, it is important to distinguish claims that define descriptive material per se from claims that define statutory inventions. The following is an example of statutory subject matter: "A computer readable medium encoded with a computer program".

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al.(hereinafter "Lee", "*Fast head modeling for animation*") in view of Migdal et al.(hereinafter "Migdal", US Patent 6,208,347).

Regarding claim 1, Lee teaches all the limitations except determining and redetermining sample numbers of each connection line, adding or deleting the loops, outputting the 3D threads and producing a regular triangular grid sample model according to the 3D threads, and locking the position of the reconstructed 3D model despite of the sample numbers. Lee teaches a computer-implemented method of reconstructing a regular 3D model by feature-line segmentation on page 1 first paragraph lines 1-5 ("*We present a method to reconstruct 3D facial model for animation…from range data…It is based on extracting features on a face in a semiautomatic way and modifying a generic model with detected feature points.*"), and as shown in the feature detection step of Figure 1, comprising using a computer to perform the steps of: (a) inputting original 3D model data, on page 2 section 2 first paragraph lines 1-2 ("*…to give an animation structure to a given range data.*") and is shown in Figure 1 where original 3D data input is shown; (b) building 3D feature-lines according to the original 3D model data, as shown in Figure 3(b); (c) converting the 3D feature-lines into 3D threads having respective pluralities of connection joints, connection lines, and loops, on page 3 section 2.2 first paragraph lines 6-9 ("*To get correspondence between points from pictures and points on a generic model…a snake is a good candidate. Above the conventional snake, we add some more functions called as structure snake…*") and as shown in Figure 3(b); and (f) projecting the regular triangular grid sample model into the original 3D model to produce a reconstructed 3D model, on page 6 section

2.3.2 first paragraph lines 1-6 and page 7 lines 8-9 ("*Some of feature points are chosen for a fine modification...We collect feature points only when their positions on a modified head are inside certain limitation of corresponding points on original range data. Then we calculate Voronoi triangles of chosen feature points...Figure 5 (c) is the final result after fine modification.*"), where it is described that the captured feature points forming the triangular gird of Figure 5(a) is projected into the original model of Figure 4(a) in order to generate the reconstructed model of Figure 5(c). Again, Lee fails to teach determining and redetermining sample numbers of each connection line, adding or deleting the loops, and outputting the 3D threads, producing a regular triangular grid sample model according to the 3D threads and locking the reconstructed 3D model in the same position despite of the sample numbers. Migdal teaches (d) determining sample numbers of each connection line, adding or deleting the loops, and outputting the 3D threads, in column 22 lines 38-47("*...as 6D data points are added to or removed from the mesh, the faces of the mesh change. When those faces are changed, values calculated for any 6D data points associated with the face can change...When such alterations occur, the computer system 3 must calculate new values for the affected 6D data points or rearrange their associations with particular mesh faces.*") and in column 27 lines 22-26 ("*...incrementally adding 6D points of detail from the mesh until the mesh meets the resolution set by the user's specification, or until the mesh is created to the highest density...*"), where it is described that the number of points, which is the density that is directly affected by the sample numbers of those points, are determined for the displayed mesh; (e) producing a regular triangular grid sample model according to the 3D threads, in column 7 lines 42-45 ("*The use of the complex data points allows the modeling system to incorporate into the wire frame mesh both the spatial features of the*

object...") and in column 3 lines 21-26 ("*A typical 3D object modeling system processes the 3D point data to create a "wire-frame" model that describes the surface of the object and represents it as a set of interconnected geometric shapes...such as a mesh of triangles...*"), where it is described that the structure of the wire frame mesh of threads have an associated triangle meshed surface; and (g) redetermining sample numbers for each connection line, readding or redeleting the loops, and repeating steps (e) and (f) if the reconstructed 3D model does not satisfy resolution requirements, and outputting the reconstructed 3D model if the reconstructed 3D model satisfies the resolution requirements, in column 27 lines 22-40 ("*...incrementally adding 6D points of detail from the mesh until the mesh meets the resolution set by the user's specification, or until the mesh is created to the highest density of resolution...*"), where it is described that the density of the mesh is continually calculated or redetermined until the desired resolution is reached. Migdal also teaches that the reconstructed 3D model is locked in the same position despite of the sample numbers in column 9 lines 23-29 ("*...the present system and method maintains an optimal structure at all times during "up resolution" or "down resolution" mesh construction...Optimal construction refers to the "connectivity" of the mesh or the interconnection of the edges that join the data points and define the geometric primitives of the mesh...*"), where it is described that the structure of the reconstructed model is maintained regardless of the changes in resolution of the model. It would have been obvious to one of ordinary skill in the art at the time of invention to combine the teachings of Lee with Migdal because this combination would provide accurate reconstruction of a 3D model through acquiring feature points, instead a large amount of mesh data, and producing a reconstructed 3D

model from a regular grid formed based on the feature points, whereby the structure of the 3D model is efficiently maintained despite resolution changes.

Regarding claims 2 and 6, Lee teaches that the 3D feature-lines are based on the exterior appearance and structure of the original 3D model on page 2 second paragraph lines 1-4 ("*...a fast method applied to two kinds of input to get an animatable cloning of a person. A semiautomatic feature detection is described to get rough shape of a given face from orthogonal picture data or range data...*"), and can be seen in the transition of Figure 1 from the range data to the feature extraction section where the outer structure of the 3D model is captured.

Regarding claims 3 and 7, Lee teaches searching the connection lines on page 3 section 2.2 first paragraph lines 1-2 and 8-9 ("*We provide a semi-automatic feature point extraction method with a user interface...Above the conventional snake, we add some more functions called as structure snake...*"), where it is described that the feature points are detected from the input data, therefore all the feature points are searched and then utilized to construct closed zones as the loops which are shown in Figure 3(b). Though Lee teaches generated feature lines in Figures 3(b) and 4(b), Lee fails to teach obtaining intersection points of the 3D feature-lines as the connection joints and recording the connection lines connecting to each connection joint. Migdal teaches obtaining intersection points of the 3D feature-lines as the connection joints in column 12 lines 27-41 ("*For 3D mesh constructions, FIG. 1 depicts a plurality of data points 2a (which can be a "cloud of points" or a mesh with some connectivity information...the plurality of data points 2a will also have connectivity or other additional data associated with it...*"), where it is described that all the points comprised in mesh are obtained along with their respective connectivity information, which would describe how the points and their respective connection

lines are interconnected. Migdal also teaches recording the connection lines connecting to each connection joint in column 9 lines 26-29 ("*...the "connectivity" of the mesh or the interconnection of the edges...*") and in column 19 lines 35-40 ("*The mesh data structure 144 maintains information for each mesh face, its vertices, edges and neighboring faces. The mesh data structure 144 contains a plurality of face records (e.g., 145)...*"), where it is described that the connection lines, or edges are stored for the mesh. The motivation to combine the teachings of Lee and Migdal is equivalent to the motivation of claim 1.

Regarding claims 4 and 8, Lee illustrates combined closed regular triangular grids of the loops as the regular triangular grid sample model in Figure 5(a). Lee teaches constructing regular triangular grids in each loop according to the sample numbers of each connection line in column 27 lines 22-26 ("*...incrementally adding 6D points of detail from the mesh until the mesh meets the resolution set by the user's specification, or until the mesh is created to the highest density...*") and in column 9 lines 23-29 ("*...the present system and method maintains an optimal structure at all times...Optimal construction refers to the "connectivity" of the mesh or the interconnection of the edges that join the data points and define the geometric primitives of the mesh (e.g., the triangular mesh...*"), where it is described that by inserting points into the grid, which is a triangular grid, the mesh is therefore continually formed based on the density or sample numbers of the mesh, as also shown in the transition from Figures 2c to 2d. The motivation to combine the teachings of Lee and Migdal is equivalent to the motivation of claim 1.

Regarding claim 5, Lee et al. teaches all the limitations except determining sample numbers of each connection line, adding or deleting the loops, outputting the 3D threads and

producing a regular triangular grid sample model according to the 3D threads, and locking the position of the reconstructed 3D model despite of the sample numbers. Lee et al. teaches a computer-implemented method of reconstructing a regular 3D model by feature-line segmentation on page 1 first paragraph lines 1-5 ("*We present a method to reconstruct 3D facial model for animation…from range data obtained from any available resources. It is based on extracting features on a face in a semiautomatic way and modifying a generic model with detected feature points.*") comprising using a computer to perform the steps of: inputting original 3D model data, on page 2 section 2 first paragraph lines 1-2 ("*…to give an animation structure to a given range data.*") and in Figure 1 where it original 3D data input is shown; building 3D feature-lines according to the original 3D model data, as shown in Figure 3(b); converting the 3D feature-lines into 3D threads having respective pluralities of connection joints, connection lines, and loops, on page 3 section 2.2 first paragraph lines 6-9 ("*To get correspondence between points from pictures and points on a generic model, which has a defined number, a snake is a good candidate. Above the conventional snake, we add some more functions called as structure snake…*") and as shown in Figure 3(b); and projecting the regular triangular grid sample model into the original 3D model to produce a reconstructed 3D model, on page 1 first paragraph lines 1-8 ("*…extracting features on a face in a semiautomatic way and modifying a generic model with detected feature points. Then the fine modifications follow if range data is available…The reconstructed 3D-face can be animated immediately…*") and on page 6 section 2.3.2 first paragraph lines 1-6 and page 7 lines 8-9 ("*Some of feature points are chosen for a fine modification…We collect feature points only when their positions on a modified head are inside certain limitation of corresponding points on original range data. Then we calculate Voronoi*

triangles of chosen feature points…Figure 5 (c) is the final result after fine modification."), where it is described that the captured feature points forming the triangular gird of Figure 5(a) is projected into the original model of Figure 4(a) in order to generate the reconstructed model of Figure 5(c). Again, Lee et al. fails to teach determining sample numbers of each connection line, adding or deleting the loops, and outputting the 3D threads, producing a regular triangular grid sample model according to the 3D threads and locking the reconstructed 3D model in the same position despite of the sample numbers. Migdal et al. teaches determining sample numbers of each connection line, adding or deleting the loops, and outputting the 3D threads, in column 22 lines 38-47("*…as 6D data points are added to or removed from the mesh, the faces of the mesh change. When those faces are changed, values calculated for any 6D data points associated with the face can change…When such alterations occur, the computer system 3 must calculate new values for the affected 6D data points or rearrange their associations with particular mesh faces.*") and in column 27 lines 22-26 ("*…incrementally adding 6D points of detail from the mesh until the mesh meets the resolution set by the user's specification, or until the mesh is created to the highest density…*"), where it is described that the number of points, as well the density that is directly affected by the sample numbers of those points, are determined for the displayed mesh; producing a regular triangular grid sample model according to the 3D threads, in column 7 lines 42-45 ("*The use of the complex data points allows the modeling system to incorporate into the wire frame mesh both the spatial features of the object…*"); and outputting the reconstructed 3D model. Migdal also teaches that the reconstructed 3D model is locked in the same position despite of the sample numbers in column 9 lines 23-29 ("*…the present system and method maintains an optimal structure at all times during "up resolution" or "down resolution"*

mesh construction...Optimal construction refers to the "connectivity" of the mesh or the interconnection of the edges that join the data points and define the geometric primitives of the mesh..."), where it is described that the structure of the reconstructed model is maintained regardless of the changes in resolution of the model. It would have been obvious to one of ordinary skill in the art at the time of invention to combine the teachings of Lee with Migdal because this combination would provide accurate reconstruction of a 3D model through acquiring feature points, instead a large amount of mesh data, and producing a reconstructed 3D model from a regular grid formed based on the feature points, whereby the structure of the 3D model is efficiently maintained despite resolution changes.

Response to Arguments

Applicant's arguments with respect to claims 1-8 have been considered but are moot in view of the new ground(s) of rejection.

The applicant argues that the references Lee used in the 35 U.S.C. 103(a) rejection of claims 1-8 does not teach the reconstruction of a regular 3D model from an original 3D model. Regarding claims 1 and 5, the examiner maintains the rejection because Lee teaches reconstructing a regular 3D model from an original 3D model on page 1 first paragraph lines 1-8 ("*We present a method to reconstruct 3D facial model for animation...from range data...based on extracting features on a face in a semiautomatic way...The reconstructed 3D-face can be animated immediately...*"), as shown in Figure 1 where the original 3D data is input and then reconstructed using feature lines of the facial data to provide the facial animated 3D head.

The applicant also argues that the reference Migdal used in the 35 U.S.C. 103(a) rejection of claims 1-8 does not teach a locked-position reconstructed 3D model. However, claims 1-8 have been rejected under 35 U.S.C. 112 first paragraph for introducing new matter into the disclosure of the invention, and have also been rejected under 35 U.S.C. 103(a) using Lee in view of Midgal. The claim limitation is interpreted to recite that the structure of the reconstructed model is maintained regardless of the changes in resolution of the model, which is taught by Migdal in column 9 lines 23-29.

The applicant argues that the reference Migdal used in the 35 U.S.C. 103(a) rejection of claims 1-8 does not teach the reconstruction of a regular 3D model from an original 3D model. However regarding claims 1 and 5, in response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., a method of adjusting resolution of the reconstructed 3D model without changing the original feature lines...), as stated on page 8 3rd ¶ lines 7-10 of the applicant's Remarks, are not recited in the rejected claim(s) 1-8. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Said Broome whose telephone number is (571)272-2931. The examiner can normally be reached on 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ulka Chauhan can be reached on (571)272-7782. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

S. Broome SB
3/23/07

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